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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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★

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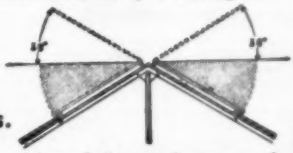

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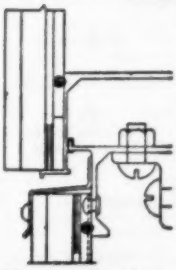

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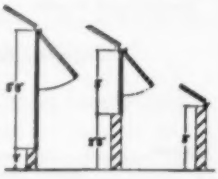

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	15 ft.			
	20 ft.			
	30 ft.			
LENGTH	Number of units 10' 2½" long			
MULTI SPAN	Total number of spans required			
	★Whether future additional spans to be allowed for			
DOORS	At one Gable end only			
	At both Gable ends			
SIDEWALL VENTILATION	Both Sides	—		
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Please state whether separate quotation and details of benching are required . . . . . .

	11 ft. SPAN	15 ft. SPAN	20 ft. SPAN	30 ft. SPAN
Side staging 3' 6" wide				
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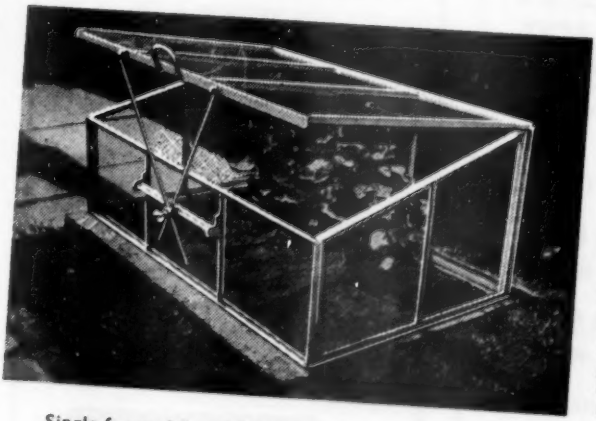

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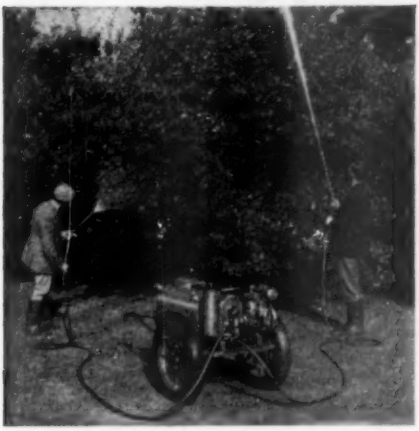

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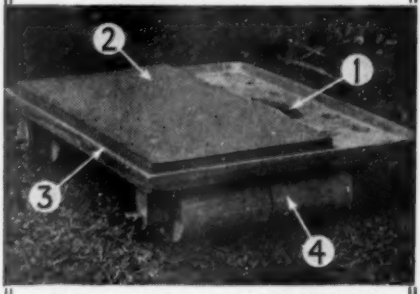

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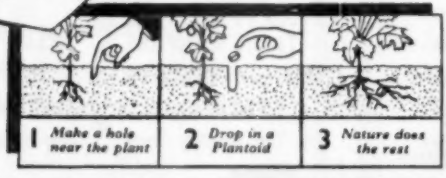

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

VOL. LXXIX PART TWELVE

December 1954

THE SECRETARY'S PAGE

ANNOUNCEMENTS—DECEMBER AND JANUARY

Shows

WEDNESDAY, December 1 10 A.M. to 5 P.M.	Fortnightly Flower Show. Late Apple and Pear Competition (second day).
TUESDAY, January 25, 1955 12 NOON to 6 P.M. WEDNESDAY, January 26 10 A.M. to 5 P.M.	Fortnightly Flower Show.

Lecture

TUESDAY, January 25, at 3 P.M. "The Production of Hardy Out-of-Season Flowers for Cutting" by MR. H. W. ABBISS, M.B.E., D.C.M., M.M., N.D.H., F.L.S.

Annual General Meeting—The Annual General Meeting to receive the Report of the Council for 1954 and a statement of accounts for that year will be held on Tuesday, February 22, at 3 P.M. The Meeting will be held in the Old Hall instead of in the Lecture Room as in previous years and there should be ample room for all who wish to attend. It is hoped that as many Fellows as possible will come and that any Fellow who reads this notice will draw the attention of other Fellows whom he knows to this change of venue.

Committee Meetings on January 4, 1955—If necessary the following Committees will meet on Tuesday, January 4, 1955, to consider novelties:

Fruit and Vegetable Committee
Orchid Committee
Joint Chrysanthemum Committee.

Anyone wishing to submit a novelty to one of these Committees on January 4, must inform the Secretary before December 31, 1954, so that the necessary arrangements may be made.

Results of the Society's Examinations held in 1954

Examination for the National Diploma in Horticulture—Of the nine candidates who presented themselves for the N.D.H. Final Examination in Section II—General Commercial Horticulture—the Diploma has been awarded to:

Mr. A. J. Bedding
Mr. R. F. Clements
Mr. J. Finney
Mr. G. W. Large

Examination for the Teachers' Diploma in School Gardening—This Examination is intended for the professional teacher giving instruction in school gardening. Nineteen candidates entered for the Intermediate section of the Examination, of whom fifteen reached the necessary standard in the written examination to go forward to the practical tests; in the practical work the standard was exceptionally low with the result that only one candidate passed the examination as a whole.

In the Final Examination nine of the seventeen candidates were successful, and the Teachers' Diploma in School Gardening was awarded to:—

Miss M. I. Aitken
Mr. R. W. Colton
Mr. E. J. Davies
Mr. G. W. Evans
Mr. R. M. Humphreys
Mr. R. F. Lewis
Mr. J. H. Martin
Mr. J. Smith
Mr. F. J. T. Wilson

The Society's Examinations in 1955—Candidates wishing to enter for the Society's Examinations in Horticulture in 1955 are reminded that the closing dates for entry forms are as follows:

General Examination in Horticulture, and General Examination in Horticulture for Juniors—Monday, January 10, 1955.

National Diploma in Horticulture—Intermediate and Final Examinations, and N.D.H. Honours—Tuesday, February 1, 1955.

Teachers' Diploma in School Gardening—Intermediate and Final Examinations—Tuesday, February 1, 1955.

Scottish Gardens Cruise, 1955—The Gardens Committee of the National Trust for Scotland has once more chartered the T.S.S. *Lady Killarney* from Coast Lines Limited and has organized a Gardens Cruise to take place from May 12 to 19. The gardens to be visited, by kind permission of the owners, are Kiloran on Colonsay; Arduaine on Loch Melfort; Crarae and Stonefield on Loch Fyne; and Brodick Castle, Arran. The Trust property of Inverewe, Wester Ross, will also be included.

Further information, details of itinerary and all cruise arrangements

are included in the brochure which may be obtained from the Organizing Secretary, Gardens Cruise, The National Trust for Scotland, 5 Charlotte Square, Edinburgh 2.

The Cultivation of Roses—By J. WILSON. A new 12-page pamphlet with 8 pages of illustrations is now available, price 1*s*., postage and packing 3*d*.

Publications—The attention of Fellows is drawn to the leaflet and order form for Publications inserted in the November issue of the JOURNAL.

NOTES FROM WISLEY

J. B. Paton

DECEMBER is not a month when the Gardens are much frequented, but for those Fellows who live near at hand a visit to Wisley on a sunny afternoon can be both pleasant and profitable. Autumn and winter fruits still can be observed, whilst this is probably the best time of year for a study of coloured barks and buds. As berried plants were discussed last month and coloured twigs in November 1953, it is proposed this month to note a few of those broad-leaved evergreens which are often neglected in gardens but which deserve a place in all collections of hardy plants, for they act as a foil for the bright flowers and fill otherwise colourless corners.

An evergreen is defined as a plant which retains its foliage green for at least a full year. A plant on which the leaves remain only over the winter is sometimes distinguished and called wintergreen. The reason for leaf-fall during the autumn is that with the approach of winter the temperature of the soil is often so low that the absorption of water by the roots practically ceases. Now, as much of the water absorbed into the plant by the roots leaves the plant by the process of transpiration from the surface of the leaves, it is clear that if only a little water can be absorbed only a little or even none at all must be transpired. One obvious way to cut down transpiration is to reduce the leaf surface from which transpiration takes place and this is done by the plant shedding its leaves. Evergreens on the other hand are able to retain their leaves because these are so often leathery of texture and are covered with a thick outer skin or cuticle. Such leaves are not only able to store water but also are able greatly to restrict transpiration.

October is usually considered the best month in which to move evergreens because at this time of year the temperature of the soil is still high enough to allow the formation of new roots. Spring planting,

with the possibility of drying winds, frost and frozen ground preventing absorption of water by the freshly moved roots, can often be dangerous. Thus when planting in the spring, it is advisable to place a screen of sacking or wattle hurdles round the plants. Should the summer following planting be a dry one an overhead spray or syringe in the evening does more good than small quantities of water applied at the roots.

The Wisley collection of evergreens is a large one for it includes of course many hundreds of Rhododendrons and Camellias. As these genera have been discussed in previous notes, admittedly from the point of view of their flowers and not from their foliage, we propose, in this instance, to consider various handsome broad-leaved evergreens of other genera.

One of the first evergreens to be seen on entering the Gardens, immediately to the right of the main gate, is the Chinese *Trachelospermum jasminoides*, introduced from Shanghai in 1844 by FORTUNE. It is an attractive climber with lustrous leaves and very fragrant white flowers. At Wisley flowers are produced but sparsely, and undoubtedly its main virtue here—and in most gardens out of doors—is its strong growth which enables it to cover large areas of wall space. Another splendid climber, the semi-evergreen *Jasminum officinale*, is to be found on the Frameyard Wall, and its variety *affine* by the tradesman's entrance to the Laboratory. The leaves, each of five to seven leaflets, are attractive at all times of the year. The type with fragrant white blossoms has a wide distribution from China in the east to Persia in the west, and has been cultivated in this country for many centuries. *J. officinale* var. *affine* has more numerous and larger pink-flushed flowers.

In the Wild Garden there is a remarkable Holly, the Japanese *Ilex latifolia*, which many visitors mistake for a Magnolia or even for a Camellia. Although not regarded as being very hardy it was planted before 1904 and it seems never to be touched by the frost. The dark green shining oblong leaves are thick and leathery, only very shallowly toothed, and often 8 inches long and 3 inches wide. All the evergreen Hollies are splendid plants for the winter months. Of the common Holly, *Ilex Aquifolium*, there are innumerable varieties, many with green leaves, many with leaves variegated with gold or with silver. *Ilex Aquifolium* var. *camelliaefolia*, to be found in the Award of Garden Merit Collection, is one of the finest of the green Hollies, forming a neat compact bush and having large dark burnished leaves up to 5 inches long and 2 inches broad, and often entirely free from spines. It bears pistillate flowers only, and so a pollen-bearing variety such as the Donnington Holly, *Ilex Aquifolium* var. *donningtonensis*, should be planted near it if its brilliant scarlet berries are required.

Also in this part of the Garden is *Osmanthus Delavayi*, introduced into cultivation by the ABBÉ DELAVAY from the mountains near Lanking, in Yunnan. Of the original seeds sent to M. M. L. DE VILMORIN only one germinated. The wide distribution of this plant in British gardens today

is due to seeds sent from China by GEORGE FORREST. The leathery leaves are more or less toothed and have tiny dark spots on the under surface. This shrub is also notable for the white scented flowers produced in April and appears to be reasonably hardy surviving all but the most severe spring frosts without injury. It forms a neat compact bush which requires only little pruning; but if pruning should be necessary it should be performed immediately the plant has finished flowering. FORREST, who introduced the *Osmanthus* which bears his name from the mountains of Yunnan, regarded it as one of the finest shrubs he ever saw. Certainly *O. Forrestii* is a beautiful shrub with its large slender pointed, entire or spiny-toothed leaves, sweetly scented white flowers and deep blue-purple berries. But it has not proved to be so good a plant for the average garden as has *O. Delavayi*. The Barberries are noted particularly for the glowing colours of their fruits. But some are excellent foliage plants and one of the best is certainly the Chinese *Berberis verruculosa* which forms an attractive plant with its rigid habit and lustrous green elliptic leaves glaucous-grey beneath. Although nothing could be more attractive on the heathland than the Common Gorse, this is not really suitable for garden cultivation. On the contrary the double form known as *Ulex europaeus plenus* makes a good garden plant in a dry sunny position on a poor soil ; on good soils it flowers but poorly. It is attractive at all times of the year with its prickly dense habit and with all leaves reduced to spiny petioles.

The slow-growing New Zealand *Olearia Haastii* makes a shapely bush which may eventually reach a height of 4 feet. It is not completely hardy in this country, but if killed to the ground it usually sends up fresh shoots in the spring. The plants at Wisley were badly injured in the winter of 1946–47 but now have fully recovered to produce their dark shining green leaves which are covered beneath with a felt of white hairs and may be up to an inch long. It is a plant which grows particularly well near the sea or in the town garden.

Leaving the Award of Garden Merit Collection and moving into Seven Acres by the path which skirts the rock bank near the Round Pond, we notice the California *Arbutus Menziesii* with beautiful leaves dark green above and glaucous or almost white below. Underneath this tree grow *Aucuba japonica* and its yellow-spotted variegated form, both excellent shrubs for a very shady position and easily propagated by cuttings. There is also *Euonymus myrianthus* which was introduced from western China by WILSON in 1908 and first flowered at Lanarth; the flowers are of no particular significance, but they are followed by four-angled yellow fruits which open to reveal orange-scarlet seeds in December.

In Seven Acres there are many interesting evergreens among which the genus *Elaeagnus* has some fine representatives near the Pinetum end of this part of the Garden. *E. pungens maculata*, also known as *E. pungens aureo-maculata* or *E. pungens aureo-variegata*, has a deep yellow blotch in the centre of the light green leaves, while the form *E. pungens variegata*

has yellowish-white margins to the leaves. These plants do best in a sunny position. *E. macrophylla* from Japan and Korea has its young stems covered with brown hairs; the oblong-elliptic leaves, rounded at the base and often with wavy and crisped margins are always beautifully silvery below and at first are dusted with silver above as well. There is also to be seen a hybrid between *E. macrophylla* and *E. pungens* called *E.* × *Ebbingei* which originated in Holland.

Of the evergreen Escallonias (and all the species except *E. virgata*, which is the hardiest, are evergreen) one of the most outstanding is the large burnished green-leaved *E.* × *Iveyi*. This hybrid arose at Caerhays as a natural cross between *E. montevidensis* and *E.* × *exoniensis* and would appear to be a reasonable hardy plant. Introduced from the Island of Chiloe by WILLIAM LOBB about 1846, *E. macrantha* makes a dense bush of luxuriant habit. It is not fully hardy in most of England, but in the south-western counties it is frequently used as a hedging plant, for it withstands strong sea winds.

Two most handsome evergreens are *Phillyrea latifolia* and *P. decora*. The former is a native of southern Europe and has 2 inch long pointed, sharply toothed, dark green lustrous leaves. Sometimes one sees it as a rounded spreading shrub, at other times as a small tree. It is a plant which will withstand clipping should this be necessary, a treatment which will not suit *P. decora* which hails from Lazistan near the south-eastern coast of the Black Sea, whence it was introduced by BOURGEAU in 1866. It is of stiff dense habit and has large elliptic-lanceolate dark glossy green leaves. As well as the plant in Seven Acres there is a fine specimen of this species in the border which runs along the northern end of the Glasshouses.

Among other evergreens to note in this border there is *Raphiolepis* × *Delacouri* which is a hybrid, raised at Cannes about 1896, between *R. indica* and *R. umbellata*. Although bred so far in the south it appears to be reasonably hardy, being only slightly damaged at Wisley in the winter of 1946–47 although elsewhere it was badly injured in exposed sites in the winter of 1939–40. Situated close by is *Bupleurum fruticosum*, which makes a small shrub and which at all times of the year is attractive with its glabrous scarcely stalked bluish-green leaves.

Leaving the Gardens the visitor will pass the exotic-looking Japanese *Fatsia japonica* with deep-lobed palmate leaves, and the common Tree Ivy *Hedera helix* var. *arborescens*, which sprawls over the lawn in front of the north end of the Laboratory.

MASTERS MEMORIAL LECTURE, 1954

THE HISTORY OF GARDEN ROSES

Ann P. Wylie

(*Department of Botany, The University, Manchester*)

(*Lecture given on August* 10, 1954; COL. F. C. STERN, M.C., O.B.E., F.L.S., V.M.H., *in the Chair*)

PART I

IN recent years, two of the Masters lecturers have spoken on kindred subjects: MR. CRANE in 1950, who discussed the origin and improvement of cultivated plants in general, and COLONEL STERN who in 1952 spoke on the contribution cytological studies have made to the advancement of horticulture. My topic today is really the application of the principles then broadly described to one particular genus of cultivated plants, the Roses. I shall precede my discussion of the history of the garden Roses by a brief consideration of the genus as a whole and by fitting those species which have been ancestral to our garden Roses into their generally accepted taxonomic position.

ANCESTRAL SPECIES

The number of species in the large and varied genus *Rosa* depends on the species-concept of the systematist concerned: in the generally accepted classification of the well-known American taxonomist REHDER (1940), which agrees reasonably well with the available cytogenetical facts, there are about 120. Roses are found in the north temperate and sub-tropical parts of both New and Old Worlds; they extend from the Arctic Circle to New Mexico in North America, to Abyssinia in North Africa and the Himalayas and into Bengal in the Far East.

In REHDER'S classification there are four subgenera, three very small and aberrant and one major one, *Eurosa*, containing the Roses proper. Of the ten sections into which *Eurosa* is divided, three again are very small and of little significance as far as the garden Roses are concerned. The seven more important sections, which all have adnate stipules, include the *Chinenses* and *Synstylae*, distinguished from the other five by their exserted styles, which are free in the former and fused in the latter. Both are uniformly diploid with fourteen chromosomes and both contain species highly important in garden Rose development (Text Fig. 1). The short-styled sections are the *Pimpinellifoliae* (diploid and tetraploid) and *Gallicanae* (tetraploid) with solitary, bractless flowers, and the *Caninae* (tetraploid to hexaploid) and *Cinnamomeae*, in which I include the related *Carolinae*, whose species range from diploid to octoploid, with corymbs of flowers. The *Pimpinellifoliae* include the familiar Scots Rose, *R. spinosissima*, and the frequently grown *R. Hugonis*, also *R. foetida*,

an important garden Rose ancestor. The *Gallicanae* contain many important ancestral Roses, too, *R. gallica* itself and also the ancient hybrids derived from it, the Damasks, Centifolias, Mosses and Albas. But the largest section, the *Cinnamomeae*, has provided no important ancestral species at all and only two of the diploids, *R. rugosa* and *R. cinnamomea*, have been concerned in minor developments.

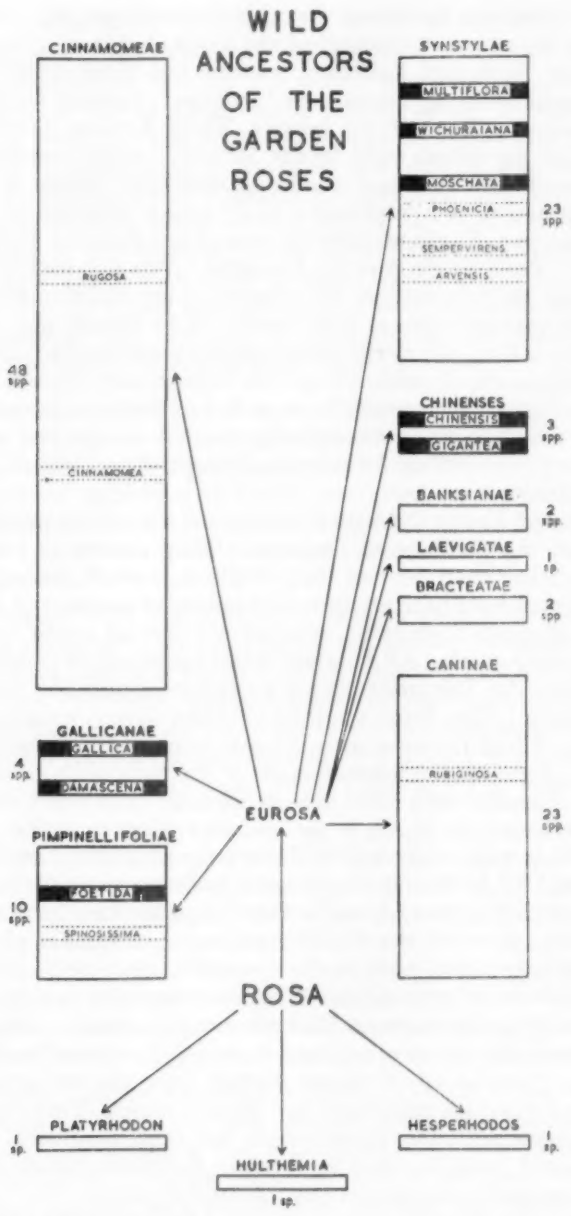
Text Fig. 1 shows the taxonomic positions of the various species involved in the origin of the cultivated Roses. We see that only seven species (or eight, if *R. damascena* is classed as a separate species) have been of any importance at all, while a further seven or eight have occupied only very minor roles, generally far removed from the main streams of Rose development. Moreover these few ancestral species are for the most part confined to three of the subdivisions in the genus. The sections *Gallicanae* and the closely related *Chinenses* and *Synstylae* contain all the major species but one and half the minor species. It should also be noted that, although there are many polyploid Rose species, these are found principally in the sections which have not contributed to garden Rose development (notably the *Cinnamomeae* and *Caninae*). Of the important ancestors, *R. gallica* (and its derivatives) and *R. foetida* are tetraploids, while all the rest are diploids.

GARDEN ROSES BEFORE 1800

The evolution of Roses in cultivation in the Western world falls clearly into two main parts, the dividing line being provided by the introduction of perpetual-flowering Oriental Roses to Western Europe at the end of the eighteenth century. Up to 1800, the European garden Roses all belonged to the section *Gallicanae*. They were hardy shrub Roses, predominantly summer-flowering only. Several groups can be distinguished, not always very sharply owing to hybridization between them. However, *R. gallica*, the French Rose, is an ultimate ancestor of them all. A very clear and fully documented account was given by HURST (1941) in the Society's JOURNAL, to which very little can be added today. I shall therefore briefly summarize the results of his cytogenetical and bibliographic researches before passing on to consider in more detail the modern era of garden Rose development.

R. gallica has an extremely long history of cultivation whose beginning cannot now be traced. As has happened in a number of Rose species, variants in which colour and degree of doubleness of the flower were affected occasionally appeared and were preserved. The group of French or Provins Roses is derived from such mutants and the products of intercrossing them. This hybridization was spontaneous until the eighteenth century, when Dutch and later French horticulturists began to breed Gallicas on a large scale. HURST (1941) reports that all the cultivated varieties of *R. gallica* examined by him were tetraploids like the wild *R. gallica* and the same is so for the few that I have looked at.

The Damask group has many characters in common with *R. gallica* and is undoubtedly descended from this species, but at present we can



TEXT FIG. 1—Relationships of the species ancestral to the cultivated Roses. The classification is that of REHDER; the number of species in each subdivision is indicated next to its rectangle, the height of which is proportional to the number of species it contains

only guess what may have been the other ancestral species. Two groups of Damask Roses can be recognized, the summer-flowering ones such as the familiar 'York and Lancaster' variety and those which produce, after the main flowering season in early summer, a second more sporadic crop of flowering shoots in the autumn. These Autumn Damasks were much prized on this account by the Romans. HURST concluded from an analysis of their botanical characters that both groups of Damasks were the products of hybridization of *R. gallica* with one of the Musk group of species: *R. phoenicia* in the case of the Summer Damasks and *R. moschata* itself for the Autumn Damasks. Although both these Musk species (like all their section, the *Synstylae*) are diploids, the Damask roses (with rare exceptions) have proved to be tetraploids. However, as we shall see later, the modern Rose groups provide plenty of examples of the development of stable tetraploids from initially triploid ancestors, so the cytological facts cannot be regarded as evidence against HURST's theories. Breeding experiments being carried out by MR. ROWLEY at Bayfordbury may eventually help in solving the problem of the origin of the Damasks.

The Centifolias or Cabbage Roses would seem to be more recent in origin than the Gallicas or Damasks. They cannot be traced with certainty earlier than the first part of the eighteenth century. Again, *R. gallica* must have been an important ancestral species and once more we can only guess as to other components of what HURST regarded as very complex hybrids. All Cabbage Roses examined by HURST (save the variety 'Rose des Peintres') proved to be tetraploids like the Gallicas and Damasks. The first Centifolia varieties were completely double-flowered and bud mutation was the sole source of new varieties until the origin of the single-flowered sport at the beginning of last century made hybridization with other groups possible. The best-known mutation in the Centifolia group is the so-called Moss mutation which occurred at least twice and possibly three times (HURST and BREEZE, 1922). The original Moss Rose then produced by further mutation a series of varieties paralleling those found in the Centifolias save for the presence of the moss. As with the Centifolias proper, a semi-single flowered Moss mutant appeared early in the nineteenth century which was then used extensively in hybridizing. The Moss mutation has also occurred independently in the Autumn Damask group (CARRIÈRE, 1865).

The remaining group of summer-flowering European Roses contains the Albas. Cytologically these are distinct from the first three groups, as they are hexaploids with forty-two chromosomes. This chromosome number agrees with the origin which has been suggested on purely morphological grounds, that is, from a *R. canina-gallica* cross with *R. canina* as the female parent (see TÄCKHOLM, 1922).

Prior to 1800 therefore, most cultivated European Roses belonged to the section *Gallicanae*. *R. gallica* itself was the principal species involved in their origin, but some groups had their inception in ancient hybridization with the Musk and Dog Roses.

THE EARLY CHINA ROSE INTRODUCTIONS

We can now turn to the second main period in garden Rose history, that is, approximately the last 150 years. The starting point was the introduction of perpetual-flowering derivatives of *R. chinensis* and *R. gigantea* from the Far East. Although, as HURST (1941) showed, varieties of *R. chinensis* were probably cultivated in Italy early in the sixteenth century, none of the early introductions into Italy, Holland, Sweden and England seems to have played any important part in the development of our modern Roses. There are four important introductions only which were used in breeding work. All of them were *cultivated* Chinese Roses, probably many generations removed from the wild *R. chinensis* (Fig. 161) and *R. gigantea* (Fig. 162) themselves. In order of introduction these four Stud Chinas, as HURST called them, are:

(i) *Slater's Crimson China* of 1792, which was figured in the *Botanical Magazine* for 1794 as *R. semperflorens*. This was a dwarf, perpetual-flowering, semi-double variety with dark red flowers. HURST (1941) reports it to be triploid with twenty-one chromosomes, but not completely sterile, so that it was possible to raise hybrids from it. There are also diploid Crimson China varieties, such as the one generally known as 'Miss Lowe's.'

(ii) *Parsons' Pink China* of 1793, said to have been sent back to SIR JOSEPH BANKS by a member of LORD MACARTNEY's embassy to China. As was also the case with SLATER's variety, this new introduction quickly found its way to France, where it was soon used in breeding work by THORY and REDOUTÉ, and from there to North America in about 1800. HURST reports PARSONS' Pink China to be a diploid and I can confirm this for the variety grown today as 'Old Blush China' is probably the same.

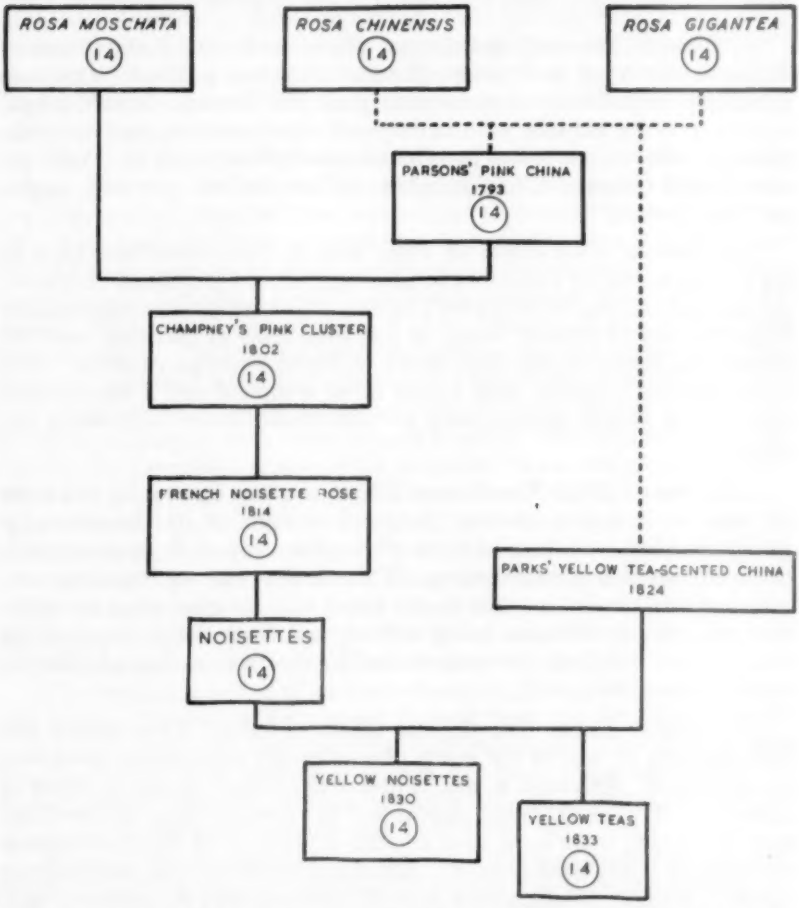
(iii) *Hume's Blush Tea-Scented China* of 1809, figured by ANDREWS in 1810 as *R. indica odorata*. Botanical analysis of its characters by HURST revealed a mixture of those of *R. chinensis* and *R. gigantea*, with the latter species predominating. This variety was an important ancestor of the Tea Roses. We do not know what its cytological constitution was, the variety now being extinct, but from the evidence of its descendants it is safe to assume that it, too, was a diploid, like its ancestral species.

(iv) *Parks' Yellow Tea-Scented China* of 1824. This variety was brought back by one of the many plant-hunting expeditions sponsored by the R.H.S. Although it, too, is now extinct, there is a good figure in REDOUTÉ (1835) as *R. indica sulphurea*. In this case also, we can infer that the variety must have been another diploid, from the chromosome numbers of Roses bred from it. According to HURST, this variety again shows a mixture of characters from *R. chinensis* and *R. gigantea*, with a preponderance of those from the latter species. It was very important in extending the range of colours found in the garden Roses and was

the only source of a real yellow until the Persian Yellow, *R. foetida*, was used in breeding many years later.

ORIGIN OF NOISETTE, BOURBON AND TEA ROSES

As is well known, the first results of crossing the new Chinese introductions with the Roses then grown in the Western world led to the development of the groups known as the *Noisettes* and *Bourbons*. Text Fig. 2 shows in outline the probable sequence of events in the origin of the *Noisettes*. The initial cross between the Musk Rose (*R. moschata*) and the new Pink China of PARSONS was made in about 1802 by CHAMPNEYS in South Carolina, the China variety having recently been imported



TEXT FIG. 2—Chart showing the principal steps involved in the origin of the *Noisette* class and the related *Tea* Roses

from France. The Rose 'Champneys' Pink Cluster' came from this cross; it combined the climbing habit and clusters of sweet-scented flowers from the Musk parent, with the semi-double pink flowers of the China parent. Like *R. moschata*, the variety was summer-flowering only, the gene for the perpetual-flowering character being recessive, as HURST showed. 'Champneys' Pink Cluster' has fourteen chromosomes like its parents and owes its origin therefore to gene recombination on the diploid level, without the complication of polyploidy.

A second generation was raised from seed of CHAMPNEYS' hybrid by PHILIPPE NOISETTE, a French nurseryman at Charleston, from which was selected the Old Blush (or French) Noisette Rose. NOISETTE sent this to his brother in Paris in 1814 and he distributed in Europe. This Rose was figured as *R. Noisettiana* in 1821 by REDOUTÉ. It is more dwarf and compact in growth than its parent and has more double flowers which are produced throughout the summer. HURST (1941) reports that it, too, is a diploid.

There was not much variation in the race of Noisettes bred in France from these early hybrids, many of which appear to have been rather sterile, until, towards 1830, the Blush Noisette was crossed with the newly introduced PARKS' Yellow China, with the aim of producing a yellow-flowered Noisette. As well as yellow Noisettes, however, such as 'Lamarque' and 'Despréz à fleurs jaunes,' this cross also gave rise to dwarf varieties, the yellow Tea Roses, of which 'Smith's Yellow' (1833) was one of the first (Text Fig. 2). Further breeding yielded varieties more and more removed from the old Noisettes and with a greater preponderance of characters from *R. gigantea*, so that these later varieties are really better described as Climbing Tea Roses; examples of these are 'William Allen Richardson' and 'Maréchal Niel.' These, it should be noted, are still diploids.

Text Fig. 3 sketches in a similar way the origin of the *Bourbon* group. For this we have to turn to Reunion Island (near Mauritius), formerly known as l'Île de Bourbon. On this island it was the custom to plant rose hedges for dividing up the land. One Rose commonly used for this purpose was the old Autumn Damask or 'Rose of Four Seasons' and another was PARSONS' Pink China. In 1817 the French botanist, BRÉON, found a handsome plant in a mixed hedge of these two varieties, which was intermediate between them in appearance. He removed this suspected hybrid to his botanic garden and seeds from it were sent to M. JACQUES, the royal gardener, in Paris. From them was raised the 'Rosier de l'Île Bourbon,' figured by REDOUTÉ in 1824. This was a vigorous plant with bright rose-pink semi-double flowers possessing the damask scent of one of its putative grandparents, and flowering well in the autumn.

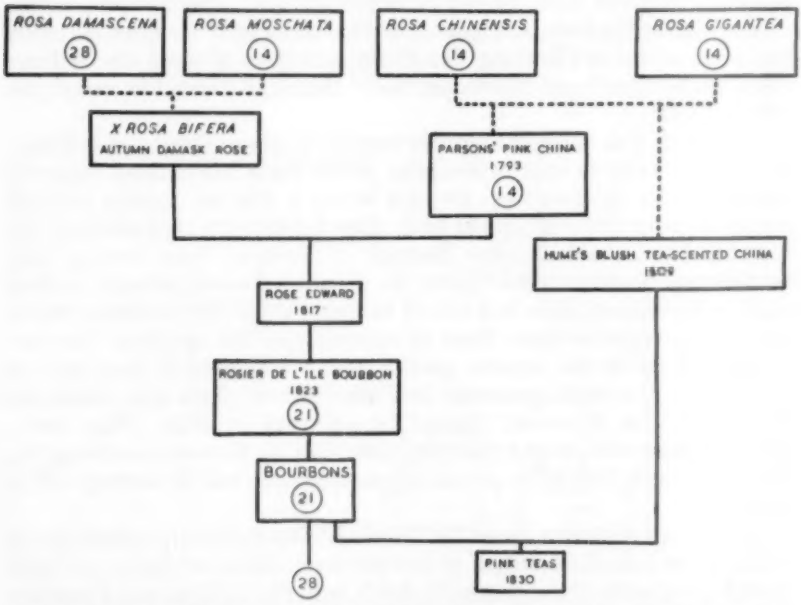
Not much is known about the detailed history of the Bourbon group widely grown in the first half of last century. Many varieties probably arose from crosses of the original hybrids with the Gallicas and Damasks, with subsequent interbreeding. Although the original Bourbon was a

triploid according to HURST (1941), this chromosome number agreeing with its assumed Damask-China origin, many of the later varieties in the class are tetraploids with twenty-eight chromosomes. Examples of these are 'Mme. Pierre Oger' (Fig. 163) and 'Louise Odier.'

As well as giving rise to this class of shrub Roses, the *Bourbons* proper, it seems that the original hybrids also played a part in the development of the Tea Roses. It is recorded that the Pink Tea Roses started from crossing a Bourbon with HUME's Tea-Scented China, which produced the variety 'Adam' (1833). These early pink Tea Roses were presumably the diploid segregates from the triploid-diploid cross and possessed a fairly high proportion of *R. gigantea* characters.

Further development in the Tea Rose class came from intercrossing the Noisette-Teas on the one hand with the Bourbon-Teas on the other. This yielded many varieties widely grown between 1840 and 1890, noted for their abundance of large, beautifully formed flowers. But, a legacy no doubt of *R. chinensis* and *R. gigantea* ancestry on both sides, these Tea Roses were not especially hardy in northern Europe and England, though flourishing in such places as the Riviera and southern U.S.A.

The cytological picture in the Tea Roses is rather more complicated than was at one time thought. By no means all the older varieties are diploids, although, as would be expected, the varieties extensively used in subsequent breeding are mainly diploid. A number of triploids have

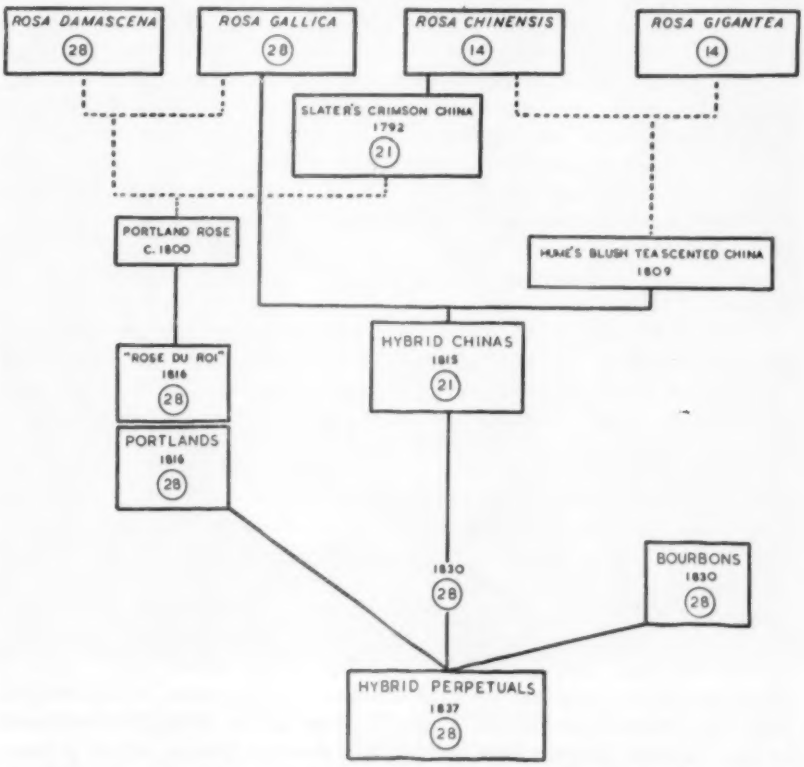


TEXT FIG. 3—Probable origin of the *Bourbon* class and the pink *Tea* Roses

now been found, for instance, 'Homère' and 'Papa Gontier,' while 'Souvenir de Gilbert Nabonnand' is a tetraploid. Similarly, 'Gloire de Dijon,' variously classified as Climbing Tea or Noisette, has long been known to be tetraploid (TÄCKHOLM, 1922). Bourbon ancestry is reported for the latter variety and the same may be the case in the other polyploid Tea Roses.

ORIGIN OF HYBRID CHINA AND HYBRID PERPETUAL CLASSES

As well as helping to create the Noisette, Bourbon and Tea Rose classes, the important China introductions were also crossed directly with the European Roses, principally members of the Gallica group, which were noted seed-bearers, to produce a race of Hybrid Chinas (Text Fig. 4). The first of these was 'Brown's Superb Blush' (1815), from a Gallica crossed with HUME's Blush China. The triploid chromosome number reported by HURST (1941) agrees with this origin. A good many other varieties came from similar crosses and most were probably triploids,



TEXT FIG. 4—Chart showing origin of the *Hybrid China* class and derivation of the *Hybrid Perpetuals*

to judge from the many complaints in contemporary literature of their sterility (see WILDON, 1932). However, about 1830 a break occurred with the appearance of tetraploids in the group. HURST mentioned 'Malton,' 'Athalin' and two others in this category. These had the reputation of being excellent seed producers (RIVERS, 1837). All these early Hybrid China varieties were once-flowering only, but carrying the recessive gene for perpetual flowering, and the fertile (tetraploid) ones were important in the subsequent development of the Hybrid Perpetuals, which were dominant for the latter half of last century along with the Tea Roses.

A number of separate streams of Rose development merged to produce this Hybrid Perpetual class (Text Fig. 4). Besides the tetraploid Hybrid Chinas, the later Bourbons (notably the variety 'Gloire des Rosomanes') were important ancestors and also the ancient Portland Roses, or Damask Perpetuals, of probably Autumn Damask and Crimson China origin. The latter small group included the famous 'Rose du Roi' (1816), from which many of the Hybrid Perpetuals are descended. The Portlands produced a succession of flowers during the summer, being much more floriferous than their Autumn Damask ancestors.

Crosses of 'Rose du Roi' with the tetraploid Hybrid Chinas, notably 'Athalin,' produced remontant varieties with larger flowers than the older Portlands. They were recognized as a distinct group in about 1835, JEAN SISLEY of Lyon was one of the early raisers of Remontants (or Hybrid Perpetuals, the somewhat inadequate English version) and he was soon joined by LAFFAY who bred many of the important early Hybrid Perpetuals, including 'La Reine' (1843). LAFFAY brought Bourbons into his crosses as well as the Hybrid Chinas and Portlands, and the famous variety 'Général Jacqueminot,' from which so many modern Roses are descended, was derived from a Bourbon ('Gloire des Rosomanes')-Portland cross.

Hybrid Perpetuals as a whole, with such varied origins, are a heterogeneous collection for which common characters are hard to find. If there is one point on which most writers are agreed, it is that the term "Perpetual" is not a good one to apply to the group, since many varieties, particularly the early ones, have only a very limited rebloom in the autumn. However, most were vigorous and hardy, with flower colours ranging from purple and deep red to pink. A few varieties were white, but there were no real yellow ones. It is possible to recognize (ELLWANGER, 1882) eleven distinct groups in the Hybrid Perpetuals, each composed of similar and, as far as we can tell from the inadequate records left, inter-related varieties. Examples of these are the 'La Reine' family with thirteen other varieties, the 'Victor Verdier' one with twenty-one and that headed by 'Général Jacqueminot' with fifteen. They can be distinguished by such characters as fragrance, which ranges from very little or none in the 'Victor Verdier' family to highly developed in the 'Général Jacqueminot' group, and autumn bloom, which is poor in 'Géant des Batailles' and its relatives and abundant in the 'Victor Verdier' group.

Photo, J. E. Downward

FIG. 160—Rose 'Nevada,' **F.C.C.** June 15, 1954, shown by Messrs. T. Hilling & Co.
(See p. 579)

FIG. 161—*Rosa chinensis*, from a drawing by ALFRED PARSONS, R.A., in *The Genus Rosa*, by ELLEN WILLMOTT (See p. 559)

FIG. 162—*Rosa gigantea*, from a drawing by ALFRED PARSONS, R.A., in *The Genus Rosa*, by ELLEN WILLMOTT (See p. 559)

Photo, J. E. Downward

FIG. 163—Rose 'Madame Pierre Oger,' one of the best of the Bourbon group
(See p. 562)

Photo, J. E. Downward

FIG. 164—Paeonia 'Rose Garland,' **A.M.** June 15, 1954, shown by MRS. G. ANLEY
(See p. 578)

Photo, J. E. Downward

FIG. 165—Lilium 'Kelmarsh,' **A.M.** July 13, 1954, shown by O. E. P. WYATT, ESQ.
(See p. 577)

Photo, Graham Thomas

FIG. 166—*Hoheria Lyallii* (See p. 575)

Photo, J. E. Downward

FIG. 167—× Lyfrenaria 'Darius,' **F.C.C.** April 27, 1954. A bigeneric cross between *Bifrenaria Harrisoniae* and *Lycaste Skinneri* 'Hellemense,' shown by Messrs. McBean's Orchids, Ltd. (See p. 544 of November JOURNAL)

FIG. 168—*Furcraea Bedinghausii* at La Mortola, Italy. *Left*, opening spike on May 1, 1954; *right*, the plant in full flower on June 6, 1954 (See p. 575)

All eight Hybrid Perpetual varieties whose chromosome number is known are tetraploids, like the groups which gave rise to the class. The occurrence of quadrivalents at meiosis and tetrasomic inheritance would help to explain the complicated behaviour in inheritance of the perpetual-flowering character.

To sum up what I have said so far: we have seen that the Far Eastern *R. chinensis-gigantea* derivatives produced the diploid climbing Noisette Roses following a cross with *R. moschata*, and the triploid (later tetraploid) Bourbon group of shrub Roses from hybridization with the Autumn Damask Rose. They also gave rise to the Hybrid China shrub Roses from crosses with the Gallica group. Further crosses of Noisettes and Bourbons to the Tea-Scented Chinas started the race of dwarf ever-blooming Tea Roses. These were mainly diploids, but there were also triploid and tetraploid varieties, particularly those of Bourbon ancestry. On the other hand, interbreeding of Hybrid Chinas, Bourbons and Damask Perpetuals yielded the race of tetraploid Hybrid Perpetuals, which were hardy shrubs with, for the most part, a limited rebloom only. These two distinct groups of Hybrid Perpetual and Tea were the dominant garden Roses from about 1840 for nearly half a century.

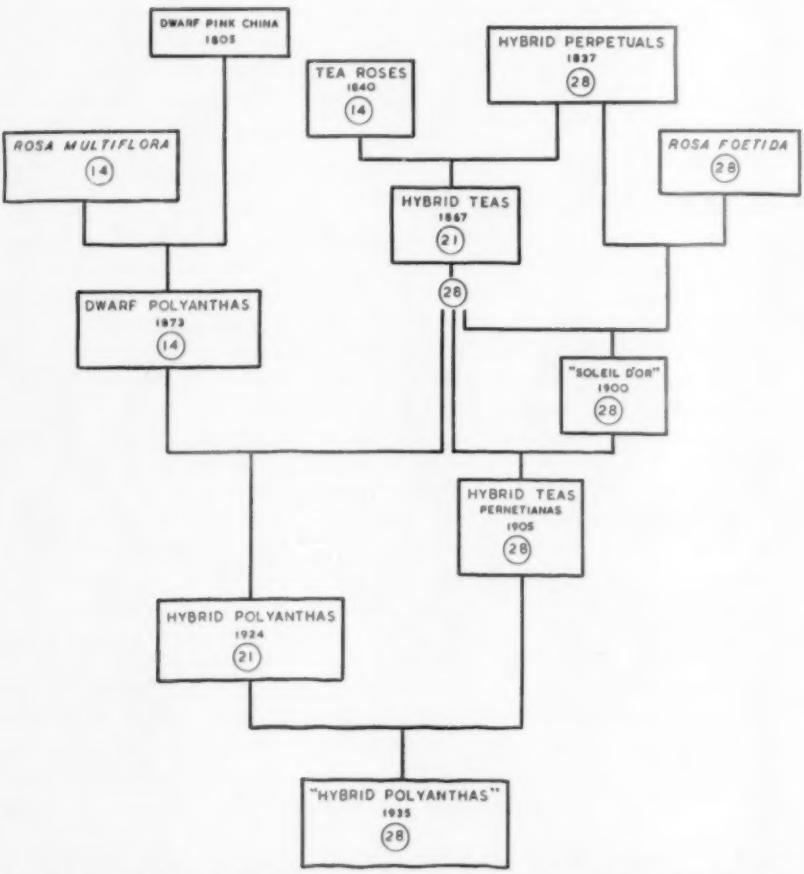
ORIGIN OF THE HYBRID TEA ROSES

As has been pointed out, each of these two groups had its limitations, and it was natural that attempts should soon be made to obtain through hybridization a race which combined the good qualities of the two. This was done in the first place by the French breeder GUILLOT, who in 1867 introduced the variety 'La France,' forerunner of the Hybrid Tea class (Text Fig. 5). Its parents have been widely quoted as the Tea Rose 'Mme. Bravy' and the H.P. 'Mme. Victor Verdier.' However, some doubt must be attached to this, as to so many of the early pedigrees, since GUILLOT (1879) himself says: "I cannot give information on the parents of 'La France,' since the seeds of the different Tea varieties were mixed together in 1864 (the year the cross was made). From its wood, thorns, leaves and flower, it is a hybrid variety derived from a Tea Rose, and not at all like other hybrids." The triploid chromosome number found for 'La France' (WYLIE, 1954) certainly agrees with a Tea-Hybrid Perpetual origin, but it seems that the actual varieties concerned are not known. As MASTERS himself wrote in 1877 about the type of record then kept by Rose breeders, "too often it is to be feared that the pedigrees given are at best mere guess work," and, again, "hence it may be that the pedigree of a florists' flower, though given in all good faith, may yet scarcely be a trustworthy document in the eyes of a physiologist." The general habit of 'La France' was that of a Hybrid Perpetual, but it possessed the fine shaped buds and free-flowering character of the Tea Roses.

The recognition of the origin of a new group was long delayed, as has so often proved the case in Rose history, and it was not for thirty years that the Hybrid Teas were generally considered as distinct from

Hybrid Perpetuals. Even as late as 1886, there was acrimonious discussion in the *Gardeners' Chronicle* on this subject.

The original triploid Hybrid Teas were for the most part rather sterile, like the first Bourbons and Hybrid Chinas, and for twenty-five years or so new varieties were produced mainly by repeating the primary Tea-H.P. cross, using different parental varieties. Many breeders were, naturally, trying to raise further generations from the desirable new hybrids and again we find many complaints in the literature of fifty years ago about their poor or non-existent seed-setting qualities. Thus DICKSON (1909) reported that hundreds of crosses were made with 'La France' before any seedlings were obtained, but as these included the famous mother variety 'Mrs. W. J. Grant,' their efforts were not wasted.



TEXT FIG. 5—Origin of the *Hybrid Tea* class, the parallel development of the *Dwarf Polyanthas* and the subsequent rise of the *Hybrid Polyanthas* from 1850 to 1950

These varieties raised with such difficulty from the primary hybrids were probably all tetraploid. This is so for 'Caroline Testout' and the fertility of such well-known H.T. parents as 'Lady Mary Fitzwilliam,' 'Mme. Abel Chatenay' and 'Liberty' leads one to suppose that they too were tetraploids. All the later varieties examined have proved to be uniformly tetraploid (WYLIE, 1954). We have already noted the origin of tetraploids from triploids in the Hybrid Chinas and Bourbons, mainly from crossing the triploids to the tetraploid side of the original cross, and we will find the same thing happening again in the later Hybrid Polyantha group.

All show the same situation; a more or less long period in the initial stages of development of the group during which progress was slow and hampered by sterility, followed by a period of exceedingly rapid production of new varieties once the tetraploid level was reached and fertility restored.

The Hybrid Teas soon took over the place formerly occupied in gardens by their ancestors, the Hybrid Perpetuals, largely on account of their more continuous flowering season, while in their comparative hardiness lay their great advantage over the Tea Roses. Flower colours were mainly in the range from deep red through pink to white; there were no good yellow varieties among the early Hybrid Teas.

The introduction of a new species into the garden Roses was necessary before the colour range in the class could be extended. This happened, as is well known, at the beginning of this century, when *R. foetida* was employed in the breeding programme of the famous French hybridist PERNET-DUCHER (Text Fig. 5). This so-called "species" (almost certainly an ancient hybrid itself) is outstanding for the brilliance of its deep yellow flowers and it was this character that PERNET-DUCHER was hoping to introduce into the Hybrid Teas. It proved to be a very slow business, however, as *R. foetida* is highly sterile and HURST (1941) records that PERNET-DUCHER crossed thousands of Hybrid Perpetuals with the Persian Yellow Rose (the double-flowered variant of *R. foetida*) from 1883 to 1888, before finally obtaining a few seeds when using the H.P. 'Antoine Ducher' as a female parent. One of the two seedlings raised was, HURST records, like a Hybrid Perpetual in habit and general flower shape, colour and scent, but resembled *R. foetida* in its rounded leaflet shape, its single flowers with bicoloured petals and its short flowering season. This, when crossed with a Hybrid Tea, produced the variety 'Soleil d'Or,' the first really yellow Hybrid Tea. It was a tetraploid, like its grandparents, and rather sterile, but not sufficiently so to prevent further crossing with the tetraploid Hybrid Teas.

At first the varieties derived from crosses with 'Soleil d'Or' and other early hybrids with the Austrian Copper (*R. foetida bicolor*) were put into a separate group, the *Pernetianas*, characterized by their brilliant yellow and orange shades (often bicolors), excessive thorniness, lack of fragrance and extreme susceptibility to the fungus disease Black Spot. The last three characters were also inherited from *R. foetida* and most

undesirable in a good garden plant. Repeated crossing to good Hybrid Tea varieties and careful selection during the next twenty-five years, however, led to the elimination of most of the faults introduced by *R. foetida* and also to the complete merging of the Pernetianas with the Hybrid Tea class proper. There are very few varieties bred today which do not trace back on one side or the other to one of the early Pernetiana varieties, such as 'Soleil d'Or,' 'Lyon Rose' or 'Souvenir de Claudius Pernet.' For instance, the widely grown variety, 'Crimson Glory,' introduced by KORDES in 1937 and subsequently used by many breeders, traces back through its parent 'Cathrine Kordes' to the old Pernetiana 'Willowmere' (KORDES, 1939).

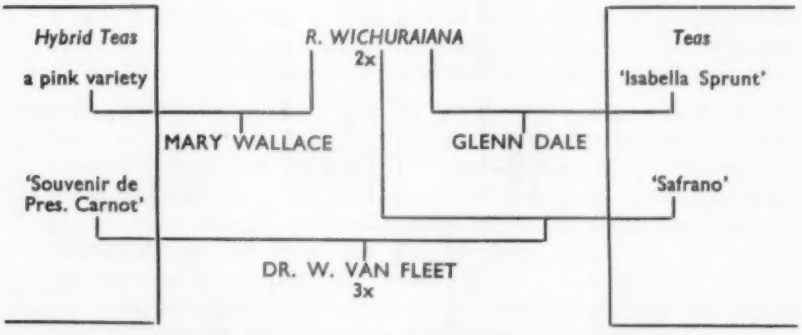
Surprisingly little accurate information is available about the genetic basis of the characters important in Rose breeding. This applies as well to many other genera which have a long history of cultivation, such as the Daffodils. Moreover the tetraploid nature of the modern garden Roses makes analysis more difficult than it would be in diploids and necessitates the raising of much larger families to recover the full range of recombination. Added to this is the highly heterozygous nature of most existing varieties, so that the working out of their genotypes in the first place entails much labour. Two American breeders (LAMMERTS, 1945, and SWIM, 1948) have published their conclusions about the mode of inheritance of certain characters based on the analysis of seedling populations: these may be summarized as follows:

A. *Characters dependent primarily on a single dominant gene*	B. *Characters dependent on the interaction of many genes*
Glossy leaves (vs. dull)	Vigour
Mildew resistance (vs. susceptibility)	Fragrance
Climbing habit (vs. dwarf)	Thorniness
Double flowers (vs. single)	Strength of neck
and probably also	Width of leaf
Rust susceptibility	Length of cutting stem
Small leaflet size	Shape of bud and open flower
Upright habit	
Billiard ball type of flower centre (as in e.g. 'Radiance')	

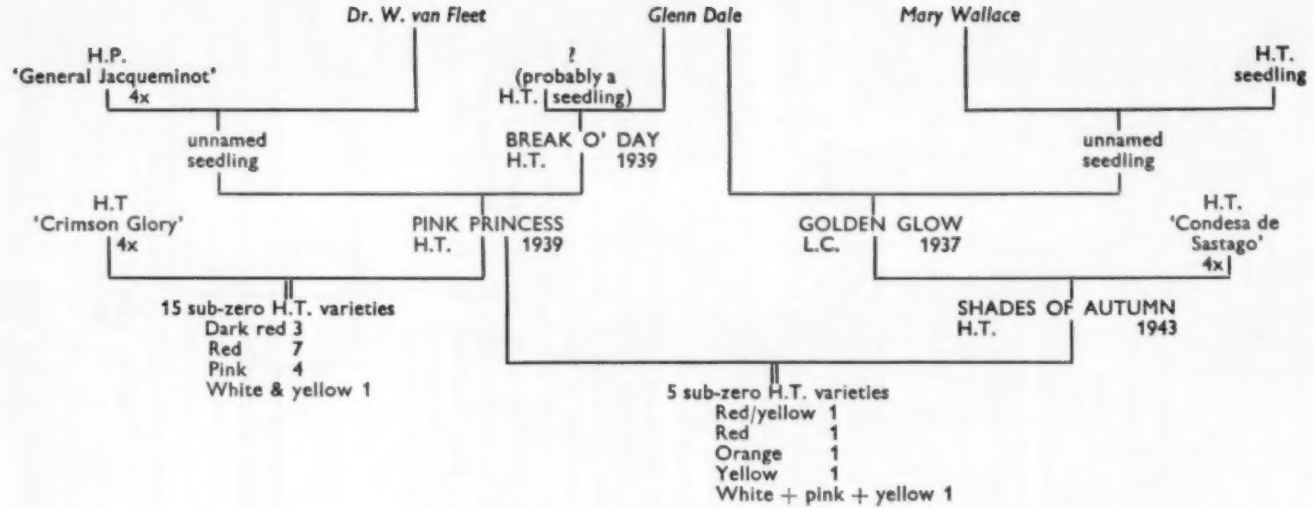
With regard to flower colour, the facts seem to be these: the dominant (wild type) colour in Roses is magenta-pink or Tyrian rose to rose-red. This pink is dominant on the one hand to dark red and also to orange-yellow, yellow, white and scarlets. Deep yellow is recessive to light yellow and white is recessive to cream and light yellow. The type of petal with a yellow or silver reverse side is recessive to the self-coloured one. VON RATHLEF (1928) estimated that two or three different factors existed for red and pink colours, three or four for yellow and that several inhibitory factors were also present. But much more work must be done before the mode of inheritance of colour is well understood.

The modern Hybrid Teas are the result almost entirely of intercrossing existing varieties of the class, no new species having been introduced since the time of PERNET-DUCHER, more than half a century ago. Continued inbreeding results, as SWIM (1948) has noted, in a marked depression of vigour, to be expected in a group derived from species which are habitually outcrossed. The most striking results have nearly always come from crossing varieties belonging to lines which have developed separately for some time. This has produced marked heterotic effects on occasion. Thus LAMMERTS crossed representatives of very distinct lines to produce the immensely vigorous and successful variety, 'Charlotte Armstrong' (1940), which has since been widely used in further breeding. Its parent varieties were 'Crimson Glory,' product of several generations of breeding by KORDES, and 'Soeur Thérèse,' the end of a long line of breeding by PERNET-DUCHER. Another example is 'Peace,' probably the most notable introduction of the post-war years. Its parents were 'Joanna Hill,' an American Rose descended from the 'Ophelia' line on both sides, and a seedling from ('Charles P. Kilham' × 'Margaret McGredy'), both of which varieties were raised by the McGredy firm in Northern Ireland, which like most of the large establishments has concentrated on line-breeding.

However, one departure from the usual type of Hybrid Tea breeding deserves to be noted. About forty years ago, the BROWNELLS, American breeders from Rhode Island, found that the Hybrid Tea varieties then in existence were quite unsatisfactory for their locality, especially with regard to winter-hardiness. They decided on the species *R. Wichuraiana* (the climber from Japan and E. China) as the most suitable source of basic breeding material in search of winter-hardy and black-spot-free Roses (BROWNELL, 1953). All the so-called "sub-zero" Hybrid Teas introduced by the BROWNELLS in the last fifteen or so years trace back to one (or more) of three VAN FLEET Hybrid Wichuraiana climbers: 'Mary Wallace,' 'Glenn Dale' and 'Dr. W. Van Fleet' whose origin is shown in Text Fig. 6.



TEXT FIG. 6—Origin of the VAN FLEET *Hybrid Wichuraiana* Climbers used in breeding hardy Hybrid Teas



TEXT FIG. 7—Origin of some of the BROWNELL sub-zero Hybrid Teas

The progenies from crossing these Wichuraiana climbers with Hybrid Teas or Hybrid Perpetuals were themselves mainly large-flowered climbers in the first generation or two, the climbing habit being dominant you will recall to dwarf, but even in the first cross with the VAN FLEET hybrids, dwarf bushy types occasionally appeared, such as 'Break o' Day.' By the third and fourth generations of crossing with good Hybrid Teas and with bushy types of *Wichuraiana* origin, varieties of true Hybrid Tea appearance were abundantly produced which were absolutely hardy and notably disease resistant. Text Fig. 7 shows how some of these were derived.

As a result of this breeding programme carried on during forty years, there are now available sub-zero H.T. varieties in all colours (and more recently some Floribundas) suitable for the climatic conditions found in Canada and north and central U.S.A. The BROWNELL varieties are not widely grown over here, our climate not demanding such hardiness, but their potential value as breeding material has not escaped the notice of such astute workers as KORDES (1951a) who, for instance, used 'Break o' Day' in creating the notably hardy Hybrid Polyantha variety 'August Seebauer.'

The Hybrid Teas themselves have, of course, been widely used in crosses with other groups, to produce initially distinct classes of cultivated Roses. But I must defer consideration of these developments until the second lecture. I have now reached the end of one of the main lines of Rose evolution and in the next part I shall have to go back a bit in time to trace what else has been happening this century besides the perfecting of the Hybrid Tea.

PLANTS AND PROBLEMS XI

LONGEVITY OF SOME SEEDS

Question. Can you please give me some information about the germination of the so-called "mummy" Wheat found in Egyptian tombs? The sale of such grain by local guides in the pyramids is often ridiculed but is there any scientific data about the germination of grains of Wheat and how it compares with that of the seeds of other plants?

Answer. Much has appeared in the press from time to time on the longevity of various seeds and many wild claims have been made especially about the "mummy" Wheat. These particular claims are quite unfounded. Experiments have shown that Wheat grains up to ten years old will germinate quite freely, but older than this the percentage germination falls sharply and after twenty-five years germination is exceptional.

Considering other plants, seeds of some members of the family Leguminosae are among the most interesting for they have a marked viability after long periods in store. In this family there are a

number of cases where seeds a hundred years old have germinated although, of course, the percentage of viable seeds is small.

SALT AS A HERBICIDE

Question. Can you kindly tell me why common salt is not used more often than it is as a weedkiller? It is cheap to buy and this summer it certainly burnt up a number of weeds around our house.

Answer. Common salt can be used as a herbicide and, indeed, has been for a number of years. It is easy to apply and cheap to buy but its use has disadvantages; on heavy soils it is liable to damage soil structure while on light soils it is readily dispersed and once in a dilute solution it will act as a plant stimulant.

CULTIVATION OF SELF-BLANCHING CELERY

Question. For some years we have been growing Self-Blanching Celery but we are not satisfied with the results. We noticed that a year or two ago you had a trial of this vegetable at Wisley. Could you please give us some advice on the cultivation of this crop?

Answer. This crop is not frequently grown in private gardens as the normal, late-maturing varieties are preferred. However, there is no reason why it should not be grown as it provides a useful vegetable for September.

The soil requires to be well cultivated and to this end it is necessary to double dig and incorporate a generous dressing of well rotted farmyard manure. Before planting it is advisable to apply a base dressing of

2½ oz. per square yard of superphosphate
1 oz. per square yard of sulphate of potash.

Seed should be sown between March 10th and 24th in heat. The seedlings should be pricked out into boxes as soon as they are large enough to handle. The plants are gradually hardened off and set out in their permanent position in late May. They should be spaced 9 inches each way in beds 6 feet wide with a path 18–24 inches between the beds. The close planting ensures that the Celery is blanched and to complete the blanching of the outside rows straw or boards should be placed round the beds when the plants are 9 inches high.

As this crop requires a plentiful supply of water throughout the growing season, water should be given to the equivalent of 1 inch of rain each week.

MANURING FOR NEWLY PLANTED FRUIT TREES

Question. I am never sure whether or not manure should be dug in before planting fruit trees and bushes. As I have some to put in as soon as weather and soil conditions allow I should like your advice on the matter.

Answer. Generally speaking manure should be used for bush fruits (i.e. Currants and Gooseberries) but not for tree fruits (Apples, Pears, Plums, Peaches and Cherries). Where hungry sandy soils are encountered, however, it is advantageous to manure for tree fruits otherwise they are liable never to become really well established. Well decayed "short" manure should be used for this type of soil and coarser more strawy material for bush fruits on heavier soils. In either case it is best to dig in the manure a week or two before planting when making the planting holes so that the subsoil has time to settle. Also, it is most important when planting to ensure that no roots come directly into contact with the manure as this can prove very harmful to the tree.

RENOVATING NEGLECTED ORCHARDS

Question. I have recently taken over a small orchard which has been neglected for a number of years. It is difficult to know where to start in trying to renovate the overgrown trees and I would be glad of any advice you can give plus the name of a good, well illustrated book dealing with the subject. The orchard contains Apple, Pear and Plum trees, most of them worth-while varieties.

Answer. Such neglected trees will almost certainly need a lot of surplus wood thinned out but it is never wise to do all of this work in one season. Wholesale removal of wood and branches in one operation is often more harmful than beneficial to the tree concerned and such work is best spread over two or three years. Pruning on the Apples and Pears can start this winter but that on the Plums should be held over until May of next year, when the risk of Silver Leaf infection will be minimized.

A brief but very well illustrated chapter on the treatment of neglected trees will be found in the Society's publication *The Fruit Garden Displayed*, price 6*s*. 0*d*.

SYCAMORE BLACK BLOTCH

Question. Has Rose Black Spot any connection with the black spots on the leaves of a large Sycamore tree growing in my garden?

Answer. The black spots on the Sycamore leaves have no connection with Black Spot on Roses. The disease of Roses called Black Spot is caused by the microscopic fungus parasite *Diplocarpon rosae* but the Black Blotch or Tar Spot of Sycamore leaves is due to the attack of the fungus *Rhytisma acerinum* which is an entirely different fungus. The Sycamore spot is very common on *Acer pseudoplatanus* (Sycamore) but less common on *A. campestre* (Maple) and *A. platanoides* (Norway Maple). The Sycamore fungus lives on the fallen leaves in winter to reinfect the following season. It is not a serious disease although when abundant it may cause the leaves to fall a little earlier. All that can be done to reduce infection is to rake up and burn the fallen leaves in the autumn.

POTATO SCAB

Question. My Potatoes this season had rough scabby skins and I am told this is Common Scab. Is there any remedy for it?

Answer. Potato Common Scab occurs mostly on light "hungry" soils deficient in humus and it is often difficult to eradicate. An important precautionary measure is to supply the Potato patch with sufficient humus such as manure, peat, vegetable compost or even grass mowings. These can be dug in almost up to planting time. Lime should not be applied as it is believed to encourage scab. The crop should be rotated as far as is possible and care taken not to use scabby tubers as seed.

CUTWORMS

Question. The enclosed grub was found in the soil during digging operations. I would be extremely grateful if you would identify it and inform me whether it is injurious.

Answer. The grub found in the soil is the larva of the Yellow Underwing Moth, *Triphaena pronuba*. The adult moths are on the wing in June and July and the eggs are deposited in large clusters on the foliage of weeds or cultivated plants. After about two weeks the larvae hatch and feed on the basal parts of the stem. Feeding continues until the following early spring when they pupate in the soil.

The larvae of this moth and related species are commonly called "Cutworms" or "Surface Caterpillars." They are dirty, greenish-grey, caterpillars which feed principally at night on the lower parts of the stems of plants, partially or completely severing them at ground level. Plants attacked in this way readily wilt or snap off at the base.

Control may be achieved by lightly dusting the base of the plants and surrounding soil with 5 per cent. gamma BHC or in the case of vegetable crops with 5 per cent. DDT.

THE RHODODENDRON BUG

Question. I enclose some Rhododendron leaves which appear to have been attacked by a rust. Can you advise me how to prevent it spreading to the other bushes in my garden?

Answer. Your Rhododendron has been attacked by the Rhododendron Bug *Stephanitis rhododendri*, which causes a pale mottling of the upper surface of the leaves and chocolate spotting of the lower.

The lacy-winged adults, which are about $\frac{1}{8}$ inch long, appear in August. The eggs are inserted into the midribs on the underside of the younger leaves during August, September and October. The nymphs emerge the following May or June and cluster together, feeding on the lower surface of the leaves.

Infested bushes should be sprayed with DDT (wettable or miscible) in mid-June and again three weeks later.

NOTES FROM FELLOWS

Furcraea Bedinghausii

THESE photographs of *Furcraea Bedinghausii* (Fig. 168) were taken only five weeks apart and give some idea of the rapidity of this plant's flowering growth. The first was taken about four days after the flowering shoot appeared on May 1, the second, when the plant was in full flower and about 15 feet high on June 6. The creamy waxen flowers are now fully opened on the cascade-like flowering shoots. It is quite one of the most beautiful of its kind. The first of these plants was brought here over sixty years ago by my father-in-law SIR THOMAS HANBURY, and only once before have they flowered in this garden; that was in 1938, when fifteen of them flowered at the same time on one sunny slope. The trunk is about 14 feet high with rough silvery bark and blue-grey foliage.

I only have six more plants, and luckily this time they have not caught the flowering infection, as they are widely separated. Young plants can be grown from seed and from tiny plants which form bulbils on the flowering bracts. But they are very slow growing, taking at least forty years before they flower and die.

DOROTHY HANBURY-FORBES

La Mortola,
Ventigmilia,
Italy.

Hoherias

When July arrives a search will reveal that there are several good shrubs still to bloom, after the great rush of blossom in June. The Fuchsias, Hypericums, Hydrangeas, Stewartias, and several other noteworthy genera are joined by the Hoherias, New Zealand shrubs of large dimensions and great beauty, bearing white flowers.

The Hoherias belong to the Mallow family and the name preserves in Latin form the Maori 'Hoihere.' Their soft bark and the shape of the leaves recall the Chilean *Abutilon vitifolium*. For many years known as *Plagianthus* or *Gaya Lyallii*, *Hoheria Lyallii* is the name under which the most popular species is known, and a more gracious shrub of about 12 feet in height and width I do not know. It is an erect grower while young, after which the branches open and fork gracefully, for the smaller twigs weep under the weight of the foliage and flowers. Just such a growth is shown in the photograph, taken at Clarendon Park, the home of MR. and MRS. CHRISTIE-MILLER, near Salisbury, where I was fortunate in catching a fine specimen just at its best on July 18th. The sage green of the leaves makes a soft foil for the flowers, which show creamy yellow anthers. They have a lace-like effect and a most pleasing quality, but very little scent. On young shrubs the flowers tend to be hidden among the luxuriant foliage (Fig. 166).

In the garden this shrub is not particular in regard to soil; at Clarendon Park it is rich and moist and lime-free, while at COLONEL F. C. STERNS' chalk garden at Goring-by-Sea, Sussex, *H. sexstylosa* has made a wonderful plant up to 18 feet or so. This species flowers several weeks later and has shiny narrow leaves distinctly serrate, and a more erect habit. Even later is *H. populnea* which is also strong-growing.

It is very difficult to visualize the space these shrubs will cover, when a small plant arrives from the nursery, but they do not take kindly to pruning, and, moreover, such restrictive treatment should not be accorded to specimens of so much inherent grace and charm. The ideal would be to plant them as individuals, with a dark-foliaged tree behind them, such as a Copper Beech or purple-leaved Plum, and some big clumps of lavender- or blue-flowered plants in front, such as Agapanthus or Aster 'Frikartii.' I do not think they are very long-lived trees in cultivation over here, and they cannot be described as hardy except in sheltered gardens, but *H. Lyallii* seems reasonably hardy in the South and West of England; several fine specimens are thriving in gardens of my acquaintance.

GRAHAM THOMAS.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1954

Angelonia Gardneri A.M. June 29, 1954. A greenhouse perennial introduced from Brazil about 1838. It has slender stems about 30 inches tall, with linear-lanceolate, decussate leaves 4 inches long. The flowers are about an inch across, five-parted, in colour Campanula Violet (H.C.C. 37/1), spotted inside, and they are carried in long, graceful racemes. Exhibited by The Director, Royal Botanic Gardens, Kew.

Campanula glomerata superba A.M. July 13, 1954. An excellent hardy herbaceous plant forming a mass of erect stems 2 feet high, clothed with ovate-lanceolate leaves and bearing dense clustered heads of Violet (H.C.C. 36/1) flowers. Exhibited by Capt. Collingwood Ingram, Benenden, Kent.

Dregea sinensis A.M. August 10, 1954. A tender flowering climber native to China. It has broadly ovate leaves 3 inches long, and umbels of a dozen or more small white, red-dotted flowers. It is figured in the *Botanical Magazine* (t. 8976) as *Wattakaka sinensis*. Exhibited by L. Maurice Mason, Esq., Talbot Manor, Fincham, Kings Lynn.

Escallonia 'Donard Radiance' A.M. June 29, 1954. A strong-growing shrub of erect, compact habit. It has short, axillary racemes of Carmine Rose (H.C.C. 621) chalice-shaped flowers each ¾ inch across,

contrasting agreeably with the glossy, dark green foliage. It appears to be a very floriferous variety. Exhibited by Messrs. Slieve Donard Nursery Co., Newcastle, Co. Down.

Hypericum patulum 'Hidcote' A.M. July 27, 1954. This large-flowered form of *Hypericum patulum* is unusually hardy, and retains its foliage through winters of ordinary severity. The golden-yellow petals are broad and smooth, and surround a neat crown of erect stamens. Exhibited by Messrs. T. Hilling & Co., Chobham, Woking.

Ixora chinensis A.M. June 15, 1954. A greenhouse shrub introduced from China in 1822, and formerly much grown as a pot plant. The specimen shown carried a dozen large corymbs of light orange flowers. Exhibited by The Director, Royal Botanic Gardens, Kew.

Laeliocattleya 'Joan Gilbert' A.M. September 7, 1954. The spike bore a single flower almost 5 inches in diameter with sepals and petals of a rich Indian Yellow (H.C.C. 6/2) shaded with copper and faint purple at the tips of the petals. The strongly frilled labellum was Garnet Lake (H.C.C. 828/2) with gold veining. Raised and exhibited by Messrs. Black & Flory, Ltd., Orchid Nursery, Slough, Bucks.

Lilium Davidii F.C.C. July 27, 1954. A very beautiful and easily grown Lily native to Western China. The brownish-tinted stem rises erect from the bulb to a height of 4 or 6 feet, bearing narrow, spreading leaves and a terminal raceme of up to twenty more or less pendulous flowers. The reflexing perianth-segments are bright orange-red freely spotted with black. This species is a stem rooter, and if planted 8 inches deep in soil containing plenty of leaf-mould it soon spreads by means of underground rhizomes. Exhibited by The Director, Royal Botanic Gardens, Kew.

Lilium (Martagon album × Kelloggii) 'Kelmarsh' A.M. July 13, 1954. A most handsome hybrid raised by the exhibitor. It has a sturdy bronze-tinted stem about 6 feet tall bearing whorls of lanceolate leaves up to 7 inches long, and a raceme of about seventeen well-spaced pendulous flowers on slightly ascending pedicels. The perianth-segments are wide-spreading and slightly recurved at their tips. The open flower measures $2\frac{3}{4}$ inches in diameter, and has a whitish ground-colour heavily suffused with purplish-maroon outside, and a pinkish ground freely speckled with dark colour within. Exhibited by O. E. P. Wyatt, Esq., Maidwell Hall, Northampton (Fig. 165).

Lilium Shelburne Hybrids 'Winter Sunset' A.M. July 13, 1954. This hybrid has much the habit and foliage of *L. regale*, which is one of its parents. The flower is about $4\frac{1}{2}$ inches long and as wide. The inside is silvery rose-pink, with deep yellow at the base; outside the perianth is flushed and banded with brownish-red. Exhibited by Col. F. C. Stern, O.B.E., M.C., F.L.S., V.M.H., Highdown, Goring-by-Sea.

Paeonia lutea var. Ludlowii A.M. May 25, 1954. A very fine variety first collected by Kingdon-Ward and subsequently by Ludlow, Sherriff and others in S.E. Tibet. It forms an erect, deciduous bush at present 6 or 7 feet high. The golden-yellow, saucer-shaped flowers,

each 4½ inches across, are borne in clusters from the apical buds of the previous year's wood, and open as the leaves are beginning to expand. The mature leaf is imperfectly biternate with lobed and sharply incised oval leaflets up to 7 inches long, with a petiole sometimes nearly a foot long. Exhibited by Messrs. R. C. Notcutt, Ltd., Woodbridge.

Paeonia 'Rose Garland' A.M. June 15, 1954. A beautiful variety with single flowers 5 or 6 inches across. The broad petals are of a bright salmon-rose colour, and surround a cluster of golden stamens. Exhibited by Mrs. G. Anley, Wych Hill, Woking (Fig. 164).

Paeonia suffruticosa 'Cassandra' A.M. May 25, 1954. A very beautiful Tree Paeony raised by the exhibitor. It has a semi-double flower with rosy-carmine obovate petals 3½ inches long enclosing a tuft of gold-tipped stamens. Exhibited by Col. F. C. Stern, O.B.E., M.C., F.L.S., V.M.H., Highdown, Goring-by-Sea.

Passiflora quadrangularis A.M. August 24, 1954. The Granadilla is a native of the West Indies and has been in cultivation in this country for nearly two centuries. It is a strong climber with broadly ovate leaves up to 8 inches long and is suitable for a warm greenhouse. The flower is pendulous and cup-shaped, 4½ inches wide, and has pink and white petals and a remarkable corona of long white filaments banded with red and purple. The fruit is ovoid, yellowish-green, about 8 inches long, and contains a sweet, edible pulp. Exhibited by L. Maurice Mason, Esq., Talbot Manor, Fincham, Kings Lynn.

Philadelphus 'Sybille' A.M. July 13, 1954. The specimens exhibited had long, arching growths closely set with lateral branchlets averaging 3 inches in length, each bearing glossy ovate leaves 1½ inch long and usually three flowers. The individual flower is about 2 inches across, rather squarish in outline, white with faint purple centre spot, and strongly fragrant. Being of modest size this is one of the best for the smaller garden. Exhibited by L. Maurice Mason, Esq., Fincham, Kings Lynn.

Populus candicans 'Aurora' A.M. July 27, 1954. An interesting variegated form of the "Balm of Gilead," in which most of the leaves are more or less creamy-white in colour. The exhibitor recommends severe pruning and heavy manuring for the best results, and states that the plant has never shown any sign of reversion even when propagated from root-cuttings. Exhibited by Messrs. Treseders Nurseries (Truro) Ltd., Truro.

Primula prolifera A.M. May 25, 1954. A hardy and vigorous species of the Section Candelabra. It forms a massive crown of oblong to subspathulate, efarinose leaves as much as a foot long with numerous easily discernable lateral veins. In late May it produces stout, erect scapes up to 2 feet tall, bearing two or three superposed whorls of bright yellow flowers an inch across. Exhibited by R. Olaf Hambro, Esq., Logan, Stranraer, and the Commissioners of Crown Lands, Windsor Great Park, Berks.

Pyrostegia ignea A.M. July 13, 1954. A tropical evergreen climber native to Brazil, sometimes known as *Bignonia venusta*. The freely-branched growths bear compound leaves composed of two ovate, acuminate, deep green leaflets. The tubular, five-lobed, Saturn Red (H.C.C. 13) flowers, each 2½ inches long, are borne in bold, pendulous clusters of about thirty. Exhibited by L. Maurice Mason, Esq., Talbot Manor, Fincham, Kings Lynn.

Reevesia pubescens A.M. July 27, 1954. A shrub from the Eastern Himalaya and South-western China, suitable only for the most favoured localities in the British Isles. It has dark, oblong, evergreen leaves 3 inches long, and dense terminal panicles of scented white flowers each ½ inch across. Exhibited by Sir Henry Price, Bt., Wakehurst Place, Ardingly.

Rosa Dupontii A.M. June 29, 1954. A very attractive hybrid over a century old, believed to have originated from *R. moschata* × *R. gallica*. It forms a rounded bush 6 feet tall with light green foliage and numerous single white, blush-tinted, fragrant flowers over 3 inches across. Exhibited by Messrs. T. Hilling & Co., Chobham, Woking.

Rosa laevigata A.M. May 25, 1954. A vigorous, half-hardy, evergreen climber native to China and naturalized in the south-eastern U.S.A. It has leaves composed of three or five lustrous ovate or lanceolate leaflets, and solitary, fragrant white flowers 2 or 3 inches across. Exhibited by Sir Ralph Newman, Bt., Blackpool, Dartmouth.

Rose 'Nevada' F.C.C. June 15, 1954. A beautiful Rose, stated to have arisen from a cross between 'La Giralda' and *R. Moyesii*, but showing little influence of the latter parent. It forms a sturdy bush up to 7 feet high with practically thornless, arching branches bearing two crops of flowers—the first in June and the second from August onwards. The flower is single, 4 inches across, the flesh-coloured bud opening creamy white with a central cluster of yellow stamens. Exhibited by Messrs. T. Hilling & Co., Chobham, Woking (Fig. 160).

Rosa pomifera duplex A.M. June 15, 1954. This double form of the "Apple Rose" also known as "Wolley Dod's Rose" forms a vigorous bush reaching a height of 8 feet. It has soft grey-green foliage and semi-double clear pink flowers carried in large clusters. Exhibited by Messrs. T. Hilling & Co., Chobham, Woking.

BOOK NOTE

"Wild Flowers. Botanising in Britain." By J. Gilmour, M.A., and M. Walters, M.A., Ph.D. Pp. xiv + 242, with 45 colour photographs, 27 photographs in black and white, and 3 line drawings. The New Naturalist. London, (Collins), 1954.

Wild Flowers, which has recently been published in the main New Naturalist series, is a very welcome addition to popular books on British plants. The authors, who are well-known professional botanists, both in field botany and in experimental taxonomy, have written a masterly book full of enthusiasm, rich in its contents and illustrations, and easy to understand by all who read it. The main title may be somewhat misleading because under "Wild Flowers" one might expect a book dealing with the identification

of plants. Although the authors have included some keys to groups difficult for beginners (Appendix II), and have given the essential characters for distinguishing allied species, the book is mainly devoted to the history, biology and ecology of the British flora, with special reference to the ecological preferences and cytological peculiarities of individual species. In addition, the authors have indicated many ways in which amateurs by observation of plants in the field and by recording and experiment could be of great assistance in the study of the British flora. The methods and equipment for the collecting and preservation of specimens, as well as the selection of reference books given by the authors will be very helpful to beginners (Appendix I). Technical terms are explained in a glossary which is combined with the index, but there is no difficulty in using it.

This book should be regarded as a valuable complement to Dr. Turrill's book, *British Plant Life*, published in the same series in 1948.

The whole book contains fourteen chapters and each author (indicated by his initials) is responsible for certain chapters or sections of a chapter.

In the first chapter, "The anatomy of field botany," aims and methods of botanizing have been discussed. The next chapter "How our flora was discovered," deals with the history of British botany, which began in the middle of the sixteenth century when William Turner, the "Father of British Botan[illegible] third chapter, "The biology of our flora," is co[illegible] plants from embryo to embryo, and with the di[illegible] and biotic) determining vegetation. Further, [illegible] analysed. The last section of this chapter sho[illegible] its modern concept. The fourth chapter, "Ho[illegible] the history of the British flora which is based [illegible] various deposits, such as coal, limestones, clay[illegible] to descriptions of the most important British [illegible] These chapters include: woodlands (oakwood[illegible] pinewoods, alderwood and carr), hedgerows, [illegible] limestone uplands, mountains, bogs, fens, mar[illegible] (sand-dunes, shingle, salt marshes, cliffs and ro[illegible] ground and walls. The authors have produced [illegible] The selection of the plants characterizing parti[illegible] skill. In the last chapter, entitled "How to g[illegible] out in the field and learn plants by experience; a f[illegible] specimens will add greatly to their knowledge. [illegible] student could participate in work on British [illegible] groups in the field and in the herbarium, using t[illegible] of species, particularly that of a single species, [illegible] taxonomic methods.

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The photographs in black and white are very artistic. Unfortunately, the colour photographs are not uniformly good. In addition to several fine photographs (e.g. Plates 7, 9, 11), there are some in which the colours are not well reproduced (e.g. Plates 6, 15, 31) or the plants are out of focus (e.g. Plates 5, 8, 13, 18).

Both authors are to be congratulated on this excellent book which will be not only of considerable assistance to the beginner but also of great interest to the more advanced amateur or professional botanist.

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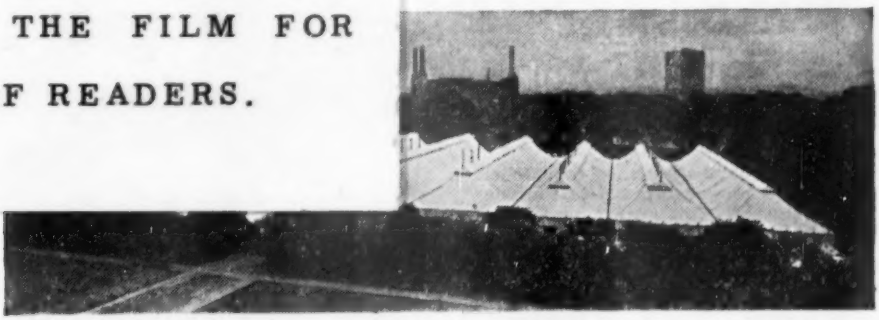

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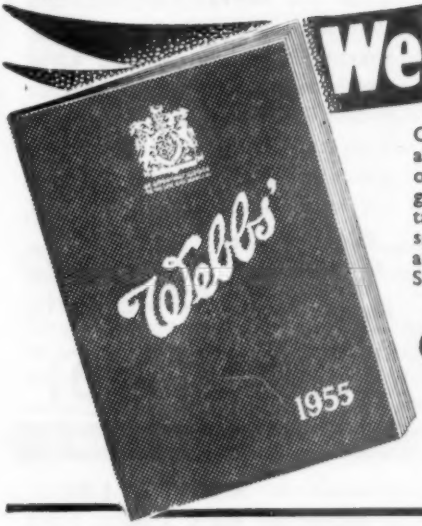

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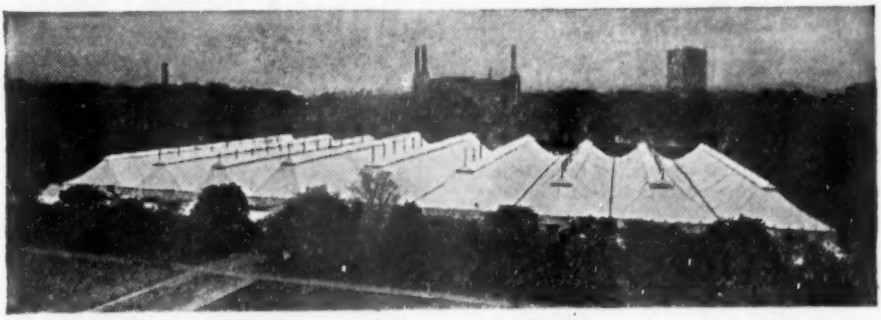

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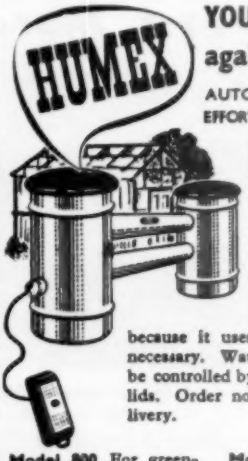

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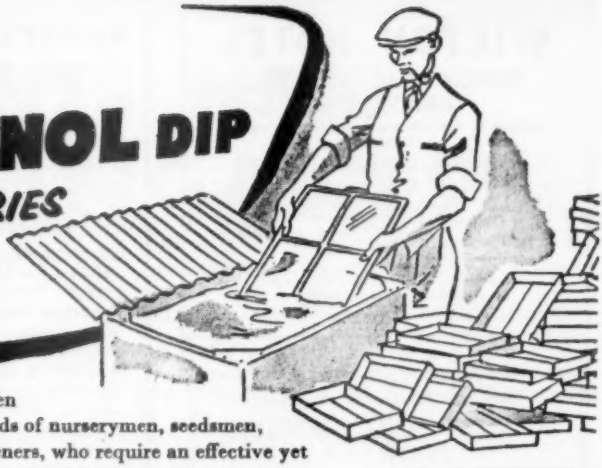

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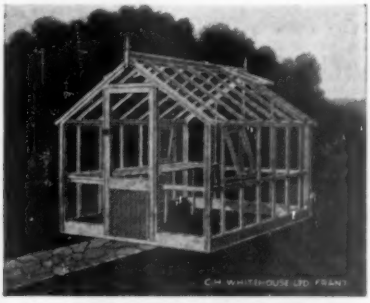

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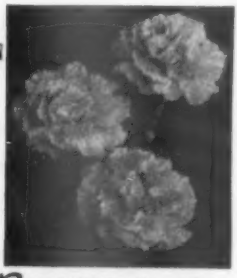

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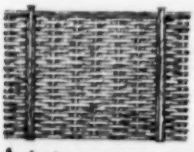

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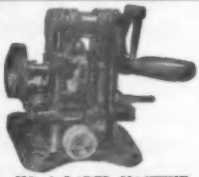

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R.H.S. YEAR BOOKS

DAFFODIL AND TULIP

For hybridizers of Daffodils there are Mr. Guy L. Wilson's informative account of recent developments in the breeding of white Daffodils, Mr. Campbell Duncan's account of pink Daffodils in Tasmania and Mr. J. M. de Navarro's list of pedigrees of good varieties. Col. F. C. Stern writes about Daffodils at Highdown, and Mr. Guy Wilson about highlights of the 1954 season. Mr. Wilfrid Blunt describes a 12th-century drawing of a Tulip. Mr. George R. Barr has written a practical and highly informative article on the cultivation of Tulips and Mr. J. F. Ch. Dix describes some of the important new Tulip hybrids in Holland. Overseas contributions include an account of Daffodils in Virginia by Mr. Harry I. Tuggle, rambling reminiscences of the 1954 season on the West Coast of the U.S.A. by Mr. Grant E. Mitsch, an immigrant's impressions of Tulips and Narcissi in New Zealand by Mr. G. A. R. Phillips, and Mr. J. A. O'More's reports of Daffodil shows in the North Island of New Zealand. Mr. de Navarro describes the highlights of the Midland Daffodil Show, and Mr. Cyril F. Coleman, the R.H.S. Daffodil Competitions. The book contains appreciations and obituaries of three great figures in the Daffodil world, Mr. E. A. Bowles, Major C. B. Habershon, and Mr. Alexander M. Wilson, as well as interesting notes, lists of awards, newly registered Daffodils and the Daffodil Ballots.

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FRUIT YEAR BOOK

The Reverend C. L. Dunkerley has written an extremely interesting account of some early English fruit books. As little has appeared previously on this fascinating subject, this article, well illustrated in monochrome and colour, makes an important contribution. Dr. L. C. Luckwill's paper on fruit drop in apples and Mr. A. P. Preston's on the thinning of apples make an interesting pair. Mr. Howard H. Crane describes his fine fruit garden at Pinner and Mr. R. E. Thoday describes fruit-growing in a Cambridge garden. The fluctuations and changes of the orchard fauna during the present century, by Dr. A. M. Massee, the maintenance of healthy fruit clones, by Mr. R. V. Harris, orchard soil management, by Dr. D. W. P. Greenham, and the identification of fruit varieties, by Mr. A. Gavin Brown, are all subjects of more than usual interest. There are two interesting contributions from abroad, one on fruit-growing in New South Wales, by Mr. E. Haines and the other on important stone fruit varieties in New Zealand, by Mr. A. Farmar. There are also Fruit Group discussions, accounts of trips to Fernhurst and Long Ashton, and a report of the Fruit Show.

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To the growers of both these genera the illustrated article on Leonardslee will be of particular interest for the large collection includes fine plants of the older Camellias and Rhododendrons, together with many of the newer introductions. The article on Colonsay describes the growing of Rhododendrons, especially those in the large-leaved series, on a windswept island on the west coast of Scotland. Mr. H. G. Hillier's account of new Camellia Hybrids, is a summary of the important developments in the last twenty years in Britain. Mr. G. H. Pinckney comments on hardy hybrid deciduous Azaleas and Mr. L. F. Frisbee of the Tacoma Rhododendron Society writes about *R. occidentale* in its native habitat on the west coast of the U.S. Capt. Neil McEacharn's account of Camellias at the Villa Taranto in Northern Italy is of interest to Camellia enthusiasts as is Mr. J. Souster's description of the method of propagating *C. reticulata* at Kew. There are reports of Shows, both here and in the U.S., Trials, Awards and a list of the Rhododendron Hybrids registered since 1953.

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Mrs. J. Norman Henry completes her account of Lilies in her garden in Pennsylvania, describing the North American species, many of which she collected in the wild. This, coupled with an interesting and informative account of Dr A. M. Vollmer's quest for native Lilies in California and Miss E. Field's competent paper on North American Lilies and their culture at a Lily Group Discussion, focuses attention on a group of Lilies which is steadily gaining in popularity. The Dowager Marchioness of Londonderry describes Lilies at Mount Stewart in Northern Ireland. Of unusual interest is Dr. Norma E. Pfeiffer's illustrated account of her new hybrids of *L. auratum* × *L. japonicum* and *L. rubellum*. Mr. F. Kingdon-Ward tells of his discovery of the new epiphytic Lily during his recent expedition to Upper Burma. Col. F. C. Stern comments on some of his new hybrids and Mr. F. J. Rose gives practical advice on when and where to plant Lilies in the average garden. Mr. T. H. Findlay describes the Lily collection at Windsor and the method used there of propagating from scales. Mrs. E. B. Trundle outlines the numerous activities of the Lily Committee of the Garden Club of Virginia. There are also reports of the Lily Group Exhibit and descriptions of plants which gained awards.

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5 ft.	25 0	30 0	35 0	40 0
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